ronic acid, taluronic acid, tagaturonic acid, arabinuronic acid, riburonic acid, ribuluronic acid, xyluronic acid, xyluluronic acid, lyxuronic acid, erythruluronic acid, erythruronic acid, and threuronic acid.

[0014] In yet another embodiment, the phosphorylated sugar is selected from the group consisting of glyceraldehyde 3-phosphate and dihydroxyacetone phosphate.

[0015] In one aspect, the sequestration of the labile molecule, for e.g., ethanolamine, may be done by encapsulation of the labile molecule within a soluble matrix, or by encapsulation of the labile molecule within an insoluble matrix. In a preferred embodiment, the labile molecule to be encapsulated is ethanolamine. In other embodiments, the labile components to be encapsulated are vitamins, growth factors, cytokines, etc.

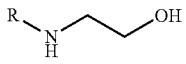
[0016] In another aspect, the labile molecule is complexed with a dendrimer before encapsulation. In other aspects, the labile molecule directly encapsulated without being complexed with a dendrimer.

[0017] In one aspect, the soluble matrix or the insoluble matrix for encapsulation may be further coated with a protective coating. In a further aspect, the protective coating may be made up of poly-L-lysine or polyornithine.

[0018] In one embodiment, the insoluble matrix may be selected from the group consisting of alginate, poly-L-lactic acid, chitosan, agarose, gelatin, hyaluronic acid, chondroitin sulfate, dextran, dextran sulfate, heparin, heparin sulfate, heparan sulfate, gellan gum, xanthan gum, guar gum, water soluble cellulose derivatives, poly-glycolic acid, PLGA (poly-lactic-co-glycolic acid), collagen, polyhydroxyalkanoates (PHA), poly-ε-caprolactone, poly-ortho esters, poly-anhydrides, poly-phosphazenes, poly-amino acids, polydimethylsiloxane, polyurethranes, poly-tetrafluoroethylene, polyethylene, polysulphone, poly-methyl methacrylate, poly-2-hydroxyethylmethacrylate, polyamides, polypropylene, poly-vinyl chloride, polystyrene, poly-vinyl pyrrolidone and carrageenan. In a further embodiment, the microencapsulation may be done with a scaffolding matrices that includes, but is not limited to, poly-glycolic acid, PLGA (poly-lactic-co-glycolic acid), collagen, polyhydroxyalkanoates (PHA), poly-ε-caprolactone, poly-ortho esters, poly-anhydrides, poly-phosphazenes, poly-amino acids, polydimethylsiloxane, polyurethranes, poly-tetrafluoroethylene, polyethylene, polysulphone, poly-methyl methacrylate, poly-2-hydroxyethylmethacrylate, polyamides, polypropylene, poly-vinyl chloride, polystyrene, poly-vinyl pyrrolidone, etc.

[0019] In another embodiment, the soluble matrix may be a molecule comprising an alcohol, a ketone or an aldehyde. In a further embodiment, the soluble matrix may be a hexose sugar selected from the group consisting of glucose, mannose, fructose, maltodextrin and galactose. In a preferred aspect, the hexose sugar may be maltodextrin.

[0020] In one aspect, the ethanolamine derivative has the following formula:



[0021] wherein R is an acetyl group or an amino acid. In a preferred embodiment, the ethanolamine derivative is N-acetylethanolamine (NAE).

[0022] In certain embodiment, the compositions described in this disclosure may be selected from the group consisting of a cell culture medium, a cell culture supplement, a feed and a cell culture media concentrate.

[0023] In another aspect, the disclosure describes a method of making a cell culture composition comprising one or more protected labile molecules, further comprising: a) derivatizing and/or sequestering the one or more labile molecules to produce the one or more protected labile molecules; b) admixing the one or more protected labile molecules with one or more cell culture components to make the cell culture composition, wherein the one or more protected labile molecules are prevented from adverse reactions with one or more cell culture components compared to an unprotected labile molecule, wherein at least one of the protected labile molecules is ethanolamine.

[0024] In a certain embodiment, the derivatization of the labile molecule may be with a sugar alcohol, or an amino sugar, or a uronic acid, or a phosphorylated sugar.

[0025] In one aspect, the sugar alcohol may be selected from the group consisting of allitol, altritol, fructitol, galactitol, glucitol, gulitol, iditol, mannitol, sorbitol, talitol, tagatitol, arabinitol, ribitol, ribulitol, xylitol, xylulitol, lyxitol, erythrulitol, erythritol, and threitol. In another aspect, the amino sugar may be selected from the group consisting of allosamine, altrosamine, fructosamine, galactosamine, glucosamine, gulosamine, idosamine, mannosamine, sorbosamine, talosamine, tagatosamine, arabinosamine, ribosamine, ribulosamine, xylosamine, xylulosamine, lyxosamine, erythrulosamine, erythrosamine, and threosamine. In a third aspect, the uronic acid may be selected from the group consisting of alluronic acid, altruronic acid, fructuronic acid, galacturonic acid, glucuronic acid, guluronic acid, iduronic acid, mannuronic acid, sorburonic acid, taluronic acid, tagaturonic acid, arabinuronic acid, riburonic acid, ribuluronic acid, xyluronic acid, xyluluronic acid, lyxuronic acid, erythruluronic acid, erythruronic acid, and threuronic acid. In a fourth aspect, the phosphorylated sugar is selected from the group consisting of glyceraldehyde 3-phosphate and dihydroxyacetone phosphate.

[0026] In one embodiment, the sequestering of the labile molecule may be done by encapsulation within a soluble matrix, or by encapsulation of the labile molecule within an insoluble matrix. In one aspect, the soluble matrix or the insoluble matrix may be further coated with a protective coating while in another aspect, the soluble matrix or the insoluble matrix may not be further coated with a protective coating. In a further aspect, the protective coating is made up of poly-L-lysine or polyomithine.

[0027] In another aspect, the soluble matrix is made up of a molecule comprising an alcohol, a ketone or an aldehyde, which may be a sugar such as maltodextrin.

[0028] In yet another aspect, the insoluble matrix may be selected from the group consisting of alginate, poly-L-lactic acid, chitosan, agarose, gelatin, hyaluronic acid, chondroitin sulfate, dextran, dextran sulfate, heparin, heparin sulfate, heparan sulfate, gellan gum, xanthan gum, guar gum, water soluble cellulose derivatives, poly-glycolic acid, PLGA (poly-lactic-co-glycolic acid), collagen, polyhydroxyalkanoates (PHA), poly-ε-caprolactone, poly-ortho esters, poly-anhydrides, poly-phosphazenes, poly-amino acids, polydimethylsiloxane, polyurethranes, poly-tetrafluoroethylene, polyethylene, polysulphone, poly-methyl methacry-